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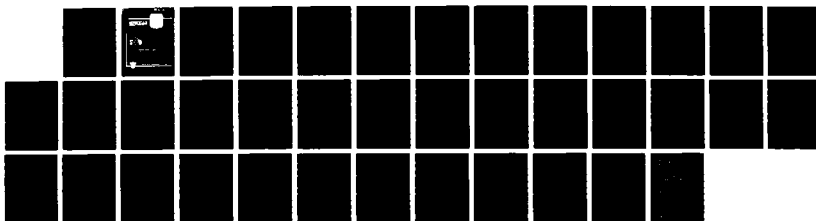
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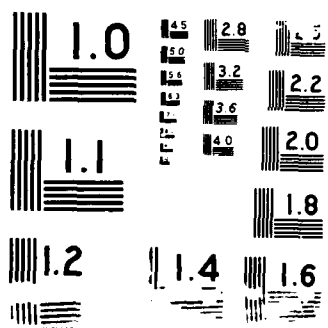
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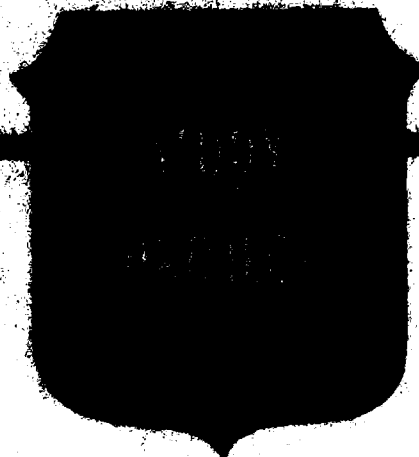
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NONDEVELOPMENTAL ITEM ACQUISITION,
FACT OR FICTION?

BY

M. A. DANSER

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) "NONDEVELOPMENTAL ITEM ACQUISITION, FACT OR FICTION?"		5. TYPE OF REPORT & PERIOD COVERED Study Project
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Mary Ann Danser		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army War College Carlisle Barracks, PA 17013-5050		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Same		12. REPORT DATE 5 April 1988
		13. NUMBER OF PAGES 34
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution is unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The United States Army requires both people and equipment to perform its assigned mission. This study seeks to determine if the procurement of systems available "off-the-shelf", known as nondevelopmental items (NDI), is a viable process. Successes and challenges are highlighted by reviewing NDI systems, both in the field and in the acquisition cycle. Conclusions and recommendations outline how the U.S. Army can field effective systems by capitalizing on the NDI process. NDI acquisitions make sense from both an economic and time (continued)		

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NONDEVELOPMENTAL ITEM ACQUISITION, FACT OR FICTION?

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

AUTHOR: M. A. Danser

TITLE: Nondevelopmental Items Acquisition, Fact or Fiction?

FORMAT: Individual Study Project

DATE: 14 March 1988 PAGES: 34 CLASSIFICATION: Unclassified

The United States Army requires both people and equipment to perform its assigned mission. This study seeks to determine if the procurement of systems available "off-the-shelf", known as nondevelopmental items (NDI), is a viable process. Successes and challenges are highlighted by reviewing NDI systems, both in the field and in the acquisition cycle. Conclusions and recommendations outline how the U.S. Army can field effective systems by capitalizing on the NDI process. NDI acquisitions make sense from both an economic and time perspective, and are adaptable for both the procurement of complex weapons systems and support systems.

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NONDEVELOPMENTAL ITEMS ACQUISITION, FACT OR FICTION?

CHAPTER I

INTRODUCTION

The United States Army requires both people and equipment to perform its assigned mission. Equipment procured ranges from individual items to sophisticated missile systems. This procurement continues to be a major topic of interest to the Army, industry, and Congress.

In general, the Army procures two types of items - developmental and nondevelopmental. While in the past most systems have been fielded through the lengthy developmental process, the Army can no longer afford the time or resources this involves. Consequently, nondevelopmental item (NDI) procurement is the preferred Army acquisition alternative and is one of the better methods of acquiring equipment in an orderly, expeditious manner under the Army Streamlined Acquisition Process.¹ NDI systems require little or no developmental effort by the Army because they are available "off-the-shelf" from a variety of sources. This paper reviews the NDI process and its advantages through examples of major nondevelopmental materiel systems purchased by the Army for use by units. It also reviews challenges to the process that

threaten its survival. It is these challenges that cause some to ask the question - "Is NDI fact or fiction?" I believe that NDI will become another casualty of the bureaucratic process and bog down under massive amounts of paperwork unless the Army can overcome these challenges.

BACKGROUND

NDI systems require little or no development effort. "NDIs can include materiel developed and in use by other U.S. military services or Government agencies, materiel developed and in use by other countries, as well as commercially available materiel. The acquisition process for an NDI is not a separate process, but a tailoring of events within the materiel acquisition process and should be one of the first alternatives considered for solution to a materiel need." ² General categories of NDI are:

1. Category A: Those off-the-shelf items (commercial, foreign, other services) used by the Army in the same manner and environment for which they were designed. "No development or modification of hardware or operational software is required." ³
2. Category B: Those off-the-shelf items (commercial, foreign, other services) designed for specific environments but used by the Army in different environments. "These items require modification to hardware or operational software." ⁴

There is also another approach to NDI "which emphasizes the

integration of existing componentry and essential engineering efforts to accomplish systems integration. This strategy requires a dedicated research and development (R&D) effort to allow for system engineering of existing components, for software modification/development, and to ensure the total system meets requirements." This approach is used when there is no end item available, but components have been identified by the materiel developer, allowing integration to meet the requirement. This process is commonly referred to as a third level of effort.

REQUIREMENTS DETERMINATION

An NDI materiel system is procured to correct an existing deficiency surfaced during the Concept Based Requirement System(CBRS) and Mission Area Analysis (MAA) process. However, because of the costs and time involved in procuring hardware systems, four other areas are examined before new hardware solutions are adopted. These include: 1) changes to doctrine, 2) changes to unit and individual training, 3) changes to or new Table of Organization and Equipment (TOE) and/or Table of Distribution and Allowances (TDA), and 4) modifications to fielded hardware. When a new hardware system is ultimately identified as the best solution for the deficiency, the acquisition process begins with the necessary requirement documents. It is during requirement documents formulation that systems are identified as NDI candidates. The two most significant documents in

this process are the Operational and Organizational (O&O) Plan and the Required Operational Capability (ROC) or, if the document will be used by more than one service, a Joint Service Operational Requirements.

The O&O Plan initiates the materiel acquisition process and outlines the impacts of employing the new hardware system in units. It explains how the system will be used, where it will be employed on the battlefield, and how it will interface with other systems. Although the combat developer is responsible for the development of the O&O Plan, the materiel developer is also actively involved because he/she uses the O&O Plan to conduct the market investigation.

Market investigation results determine if there is either an NDI product or nondevelopmental assemblies/components that can be integrated that satisfies the requirement. Investigations conducted under the approved O&O plan are also used to verify the applicability of technology and man/machine interface. These initial investigations are then used to define and identify the essential operational characteristics defined in the ROC.

The ROC is the formal requirement document that commits the Army to system development and acquisition. It is prepared by the combat developer, in coordination with Headquarters, Department of the Army; the materiel developer; training developer; rationalization, standardization, and interoperability manager; logistician; manpower and

personnel integration (MANPRINT) planner; tester; evaluator; and interested major command. This document provides the operational performance characteristics, usually in bands of performance, of the desired system. Two annexes to the ROC address assumptions, methodology, and cost effectiveness of the system, and the type of units will employ the system. These annexes are the Cost and Operational Effectiveness Analysis and the Basis of Issue Plan respectively.

It is during ROC development that requirements are scrutinized and tradeoffs determined. This requirement tradeoff process is critical to avoid including unproven capabilities/characteristics in the ROC and to keep the system in the NDI category. The tradeoff process has two phases: 1) the materiel developer performs a Tradeoff Determination (TOD). This information is provided to the combat developer along with information on materiel options available to eliminate a battlefield deficiency: 2) the combat developer then performs a Tradeoff Analysis based on the thrust, doctrine, organizational concepts, and the materiel possibilities identified in the TOD.⁶ Tradeoffs include the relaxation of system specifications whenever possible and a review of the environments where the system must perform. Ideally everyone should be equipped with the same system. However, it may be more cost effective to modify a system that will be deployed to extreme conditions, e.g., the cold arctic or arid desert. Both the combat and materiel developer must work closely together to formulate system requirements and to keep the program in the NDI realm.

The Army is committed to NDI as an acquisition alternative. Written justification must accompany the acquisition strategy when NDI is not employed. Justification must address the considerations given to NDI to ensure that NDI avenues have been completely investigated.⁷

The next chapter will look specifically at NDI history, advantages, and some systems that have been successfully fielded as NDI systems.

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3. Ibid.

4. Ibid.

5. Ibid.

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NONDEVELOPMENTAL ITEMS ACQUISITION, FACT OR FICTION?

CHAPTER II

ADVANTAGES OF NDI

In 1976, The Office of Federal Procurement Policy, within the Office of Management and Budget, directed that "Agencies shall purchase commercial products...whenever such products...adequately satisfy government needs."⁸ They saw no reason why government agencies shouldn't be able to use commercial products in the same manner as other institutions and industrial consumers. A policy was designed to take advantage of innovations and efficiencies of the common marketplace and avoid the development of duplicative Government contracts. In other words, this policy gave Uncle Sam more bang for the buck. There are a number of advantages to the NDI process: Shorter acquisition cycle, lower cost, production base maintenance and equipment commonality.

Shorter acquisition cycle: As displayed in Figure 1, the NDI acquisition life-cycle model takes two and one-half years versus the classical research and development cycle that requires 8-16 years.⁹ NDI strategy saves a considerable amount of time in the overall acquisition cycle of a system or equipment, with the real difference in the middle two phases.

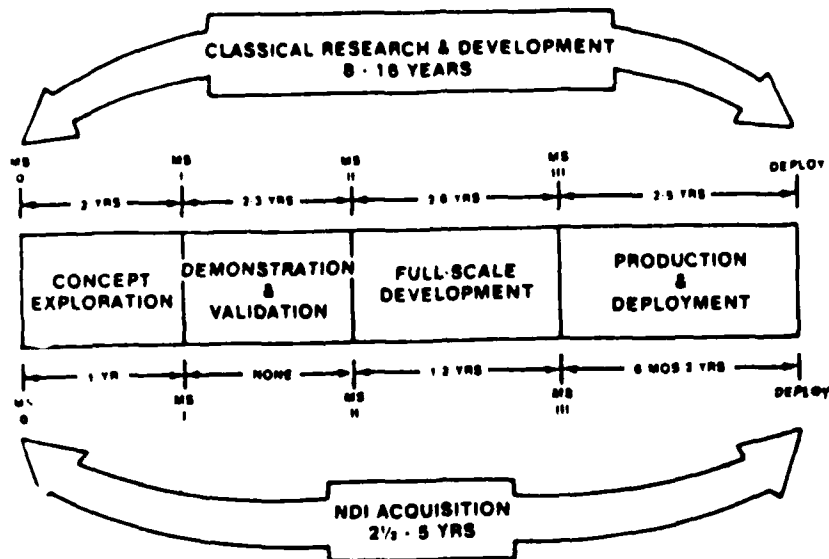


Figure 1. Acquisition Life-Cycle Model

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The standard acquisition life cycle has four phases: 1. the concept exploration phase where potential ideas, concepts and solutions are explored so a proper alternative for hardware development can be determined. 2. the development and validation phase where competing systems are reviewed to determine which contractor's system best meets the requirement and where the decision is made on whether to continue. 3. the full-scale development phase where systems are designed, fabricated, tested and evaluated. 4. the production and deployment phase. In NDI the demonstration and validation, and full scale development phases, which can range from 4-9 years, are combined into one phase. This phase is 1-2 years long and is often referred to as the acquisition documentation phase. During this phase, the Request for Proposal is prepared and proposals are received and evaluated.

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Once an NDI acquisition strategy is selected, phase two of the standard acquisition life cycle can be skipped or compressed. This is because R&D engineering, design, integration, integrated logistic support, test or evaluation effort is not needed. The NDI strategy also allows use of previous test and performance data from commercial manufacturers, users, and other services, agencies, or countries to prove both product acceptability and suitability, and military operational effectiveness and suitability.¹² To capture this benefit, independent evaluators must get involved early, participate in the program, provide independent evaluation reports and ensure that planned test and evaluation efforts satisfy the testing requirements.

Lower Cost: An NDI system costs less because there are limited R&D costs, commercial specifications available, and competition in the marketplace. An example of this is the Mobile Subscriber Equipment (MSE) currently being procured. Estimates show that MSE, a \$4.3 billion acquisition program, will save over \$500 million in R&D costs.¹³ The costs are saved because these items are generally in production and commercially available. Commercial specifications save the Army costly development of test and historical data, technical publications, drawings, manufacturer's part information, quality, safety, and reliability data. The requirements tradeoff process is also critical to keep a system's cost down.

NDI systems cost less because the preferred contract method is to award the contract to the lowest responsive bidder, unless otherwise justified. This does not imply that lowest price is always the

qualifier when contracts are awarded or that this acquisition decision is not in the best interest of the taxpayers. However, if two contractors meet the minimum stated requirement and one is envisioned to have a better product by either the materiel or combat developer, by regulation,¹⁴ the lower bidder will be awarded the contract.

Another reason for NDI is the Competition in Contracting Act requires¹⁵ that competition be maximized. Only in unique circumstances (e.g., buying a limited number of a fielded system, or when there are overriding readiness and/or logistics considerations), can a noncompetitive selection be justified. Competition is instrumental in getting a system's cost down. An example is the Army's recently negotiated five year contract on the 5-Ton Truck. This vehicle's price was reduced by \$10,000 per vehicle, attributed to competition among three vendors.¹⁶

Maintains production base: The Army's industrial mobilization base consists of Government-owned facilities and equipment and the supporting private sector industrial base. NDI procurement broadens this private sector base and increases the number of defense contractors. Congress recognizes that "War is no longer simply a battle between armed forces in the field ... it is a struggle in which each side strives to bring to bear against the enemy the coordinated power of every individual and every material resource at its command. The conflict extends from the soldier in the front line to the citizen in the remotest hamlet in the rear."¹⁷ When the peacetime defense industrial base is healthy, the rapid

expansion for emergencies and the mobilization for a major war is significantly enhanced.¹⁸ This fact has been learned and relearned by the U.S. many times. In World Wars I and II, and in both the Korean and Vietnam Conflicts, expenditures far exceeded pre-war estimates and reserves of materials were quickly exhausted. Inadequate plans for military procurement and industrial mobilization caused uncoordinated government purchasing, inequitable distribution of industrial land and resources, and inefficient use of transport systems. This produced delays, waste, violent price disturbances and unequal burdensharing. NDI procurements broadens the mobilization base with limited government investment. NDI encourages private investments in mobilization facilities and their maintenance because NDI accepts the reality of the profit motive. NDI contractors formulate their costs to include profits. (As previously stated, the lowest bidder is usually awarded the contract.) Also NDI system's requirements are often refined to keep the system in the commercial realm, but this minor decrease in capability is acceptable as a tradeoff for producability during mobilization.

Allows for equipment commonality: By procuring commercial systems in use by another service or nation, equipment commonality is enhanced. This is especially critical because it reduces the logistics burden. This commonality also allows personnel from one service/nation to operate the system of another. The advantages offered are currently being pursued in Host National support agreements and interoperability agreements. An

example of an interoperability agreement is the new Palletized Loading System (PLS). PLS is a 16.5-Ton truck that will be fielded in U.S. Army units. This concept is designed around an integral self-load/unload capability enabling the driver to load or unload the entire cargo bed from within the cab in a matter of minutes. This capability will also be fielded in the armies of the Federal Republic of Germany and in the United Kingdom. To ensure compatibility/commonality, three nations are working together as each system is designed.

EXAMPLES OF SYSTEMS PROCURED SUCCESSFULLY AS NDI ITEMS

The Army has had several major programs procured as NDI systems. The following are examples of recent successes:

Commercial Utility Cargo Vehicle (CUCV): The CUCV is a tactical wheeled vehicle family that includes 3/4-Ton and 1 1/4-Ton vehicles. The CUCV fills a requirement for a vehicle to operate in areas where the environment is not severe and a more expensive high mobility vehicle is not required. The CUCV is a basic General Motors Blazer with minor military modifications, e.g., a fording capability, cold weather kits for temperatures of 25 to 50 degrees below zero, camouflage paint and rings for sealift. Even with these modifications, the CUCV was successfully fielded in three years. The CUCV was purchased for an on-road capability and replaced vehicles with an off-road capability. This caused user problems.

But once educated the user was satisfied, and even found additional areas where a commercial vehicle was acceptable, e.g., as signal shelter carriers.

Lightweight Collapsible Pillow Tank (LCPT): The LCPT is a 170 gallon pillow tank procured as a Category A - NDI because of the wide commercial use of these tanks. The LCPT will provide potable water transport and distribution capabilities to the Light Divisions beginning in 1988. The requirement for the LCPT was surfaced during the evaluation of the maneuver division of the light forces in June 1985. The LCPT was designated Category A - NDI during the preparation of the O&O plan and subsequent market surveys. The fielding of these tanks will take three years. During these three years an O&O plan and ROC will be formulated and approved; the item type classified; procurement funds budgeted; training and testing requirements assessed; and safety/health, and logistics requirements formulated. Five firms were found technically qualified to meet the Army's minimum requirements and a contract was awarded to the lowest priced technically acceptable bidder.

Mobile Subscriber Equipment (MSE): MSE is a complicated system that totally integrates all communications system functions. Transmission equipment, switching equipment, communications security, system control, vehicles and generators are all part of the MSE system being bought from a single contractor. The acquisition strategy for MSE is very unconventional. The Army provided the bidders only a general performance

requirement, not detailed specifications or drawings. Contractors were then free to state how their proposed system met the requirement. The MSE, a landmark in NDI acquisition, will begin testing this spring at Fort Hood. Although the MSE program does comply with the statutes and conform to law, acquisition regulations were waived, as necessary, to encourage the use of commercial practices. The MSE contract was awarded in 1987, testing will begin in 1988, with fielding projected for 1989. If this program succeeds as envisioned, new doors will open for NDI acquisitions.

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9. Lehnese, Robert R., "NDI": The MSE Acquisition Strategy." Army Research, Development and Acquisition Bulletin, January-February 1987, p. 2.

10. U.S. Department of the Army. Army Regulation 70-1: Systems Acquisition Policy and Procedures. 12 November 1986, p. 28.

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13. Lehnese, p. 2.

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NONDEVELOPMENTAL ITEMS ACQUISITION, FACT OR FICTION?

CHAPTER III

CHALLENGES TO NDI

Although an NDI procurement strategy gets equipment into the hands of troops quicker and costs less than traditional developmental systems, there are several challenges that threaten its survival. These challenges include:

User requirements: "...we're starting to realize that if we want to field something before it become obsolete, then we may have to look at what's already out there and remain flexible. We can't expect the world and get it off the street. We might not have technologically advanced weapons, with all the bells and whistles, but at least we'd have the things we want and need, and probably at a better price."¹⁹

This approach challenges user requirements. Additional requirements must not be allowed to creep into the system that didn't exist when the requirement was recognized and approved. The user should recognize that although there are capabilities that would be nice to have, the Army must buy what it signed up for and worry about bells and whistles as follow-on enhancements. It has been estimated that to add an additional 10% of capability adds one-third of the cost and two-thirds of the problems in our systems!²⁰ Requirement documents must be examined and unrealistic

requirements eliminated, especially with added Congressional interest in system quality. If a system fails prototype testing, there are two options for the Army. One is to relax the original requirement and the other is to reject the system. The Army can save time and embarrassment if original requirements are realistically developed, using proven and available technologies.

The "not invented here" syndrome: This problem occurs when an NDI product is adopted, but then the Army proceeds to reinvent/redesign it. These modifications can be minor or major and are best described by using the Roland as an example. The Roland was fielded by NATO allies and was intended to fill the Army's crucial need for an air defense system without the R&D costs and developmental lag of a new system. In 1974, the Army bought 184 Roland fire units and awarded a modification contract to two developers. Seven years and \$1.1 billion later, the Army cancelled the program. From the outset the program was beset by many developmental difficulties. Having adopted the European version of an air defense system, the Army proceeded to reinvent it. The Army redesigned the Roland right out of existence. Developmental difficulties produced delays that eliminated the original rationale for adopting an existing foreign system, namely saving²¹ time. Recognizing technological breakthroughs can be captured through the NDI process saves both time and money. Money saved by not duplicating existing systems can then be directed to those areas where there are no satisfactory alternatives.

Buy American: While one form of NDI acquisition is the procurement of off-the-shelf equipment from foreign sources, there is little support in Congress to allow the U.S. Army to buy equipment not manufactured in the U.S. This is both for fiscal considerations and to sustain the technology and manufacturing leadership essential to this nation's security. The Buy-American Act (41 U.S.C. 10a-d) provides that the Government give preference to domestic source-end products. This is true for products except those to be used outside the U.S., are not available in the U.S., where the U.S. government determines the domestic cost is unreasonable, or where the country producing a product has signed a reciprocal Memorandum of Understanding with the U.S. These requirements are meant to alleviate the impact of DOD expenditures on the U.S. balance of international payments. Remembering that the lowest bidder is awarded the contract in almost all cases, the Buy-American Act, which adds a factor of 50 percent to the unit cost, often precludes the procurement of off-the-shelf foreign items.

Funding instability: As the defense budget declines, contractors are becoming more reluctant to enter the defense business. Because NDI systems require little or no R&D effort and are considered available on the commercial market, it is much easier to cut NDI programs. However, as their Total Obligation Authority shrinks, the Army must weigh modernization items against readiness efforts. Once the Army commits itself to a commercial item, it must also commit to its funding both for

the current and out-years. Out-year funding is often for replacements because the service life of a commercial item is less than a militarized item. It should be recognized that a contractor's initial bid is often a buy in. He/she often bases their profit margin on both the initial and the follow-on contract. Fewer contractors will become involved in defense business if funding fluctuates greatly from year to year.

Testing: Congress is very interested in seeing the soldiers get quality equipment. Their guidance is that "the engineering excellence of...new programs be evaluated"²² and they have given added authority to the Director, Operational Testing and Evaluation. This added authority and emphasis on testing will increase the administrative burden on the materiel developer as he tries to bypass/shorten testing on an already proven NDI system.

NDI ITEMS THAT HAVE BEEN AFFECTED BY THESE CHALLENGES

The following are examples of systems that have been delayed or affected by the challenges previously discussed:

6,000LB Rough Terrain Forklift (RTFL): This program shows the danger of both requirements creep and what happens when the combat and materiel developer do not work together to formulate requirements. In 1983, the combat developer stated a need for a forklift to unload ammunition from containers, but did not state that a shooting boom capability was required. This capability was added after visits by industry

representatives, who stated that the technology was available on the commercial market. However, because this technology could not be validated by the materiel developer during the market investigation, the Under Secretary of the Army directed prototype testing. This program will take six years by the time the first unit is equipped (currently January 1989) and shows how a system can get off track if the materiel and combat developer don't work closely to ensure requirements are adopted that capture NDI benefits. This program had so many problems that procurement funds programmed in 1984, 1985, and 1987 could not be obligated and were lost. These were funds that could have been utilized by the Army in other areas. With the declining budget, the Army cannot afford another 6,000lb RTFL type situation.

Palletized Loading System: An example of the "buy American" and "not invented here syndrome". As stated earlier, PLS is a 16.5-Ton vehicle with an integral self-load/unload design. This concept was developed by Great Britain who wanted to share their technology and doctrine with the U.S. to capitalize both on the economic benefits and on interoperability with an ally. However, under the Buy American Act and with the "not invented here syndrome", the Army opted to compete this system only among American manufacturers. This means tests must be performed that may not have been required if the British system had been purchased. Tests that will add over a year to the process. Realistically, it is easy to understand why Congress would be reluctant

to allow the Army to award a five year procurement contract to an overseas source. Especially with the number of U.S. automobile manufacturers, the weak domestic market, and the requirement that the U.S. production base be maintained. However, it must be recognized that technological breakthroughs are not all going to come to one country and we need to capture the best of everyone's technology with NDI even if an English vehicle is fielded in the U.S. Army.

Commercial Utility Cargo Vehicle (CUCV): The CUCV replacement vehicle was a victim of funding instability. The CUCV was originally procured through a five year contract that ran from 1983 to 1987. Because the CUCV service life was set at five years, procurement of replacement vehicles was to begin in 1989. However, because of budgeting decrements, the 1989 CUCV rebuy program was slipped into 1992 and the service life of the vehicle was extended to seven years. What message has this sent to defense contractors interested in the CUCV? Won't they now start investigating other areas, possibly non-defense related, where they can sell their products? What readiness and maintenance cost will the Army incur by maintaining old vehicles until new ones can be fielded? These are questions that must be addressed by the Army leadership as they make those hard budget decisions.

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19. Kitfield, James., "Is NDI The Answer?" Military Logistics Forum, January/February 1986, p. 27.

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22. Congressional Record - Extensions of Remarks, February 8, 1988 p. E188.

NONDEVELOPMENTAL ITEMS ACQUISITION, FACT OR FICTION?

CHAPTER IV

CONCLUSIONS

NDI is here to stay but efforts must be made to deal with those challenges that cause some to question the process. The most critical of these challenges is the requirements determination process. The user and materiel developer must identify system requirements and address requirements tradeoffs early. It is much easier to justify original requirements than to try to explain why requirements can be relaxed.

The Army's recently signed MSE contract "sent a clear signal of what a number of insiders characterize as a fundamental shift²³ toward the acquisition of existing nondevelopmental equipment."

We must learn from this system. As we gain additional knowledge we will continue to reap the savings, both in time and money, offered by NDI acquisitions. I recognize that NDI is not the answer for all acquisition programs, but each NDI item procured frees R&D dollars for areas where they are truly needed.

In this time of budget decline, the Army must realize that NDI²⁴ offers systems "we want and need, and probably at a better price."

Finally, NDI may offer a partial solution to America's cry for more burdensharing from our allies. If we could convince our allies to provide equipment to U.S. units, as well as other allied units, at a reduced cost - then the U.S. could reduce/or get more for their defense dollar and all could gain from the commonality this would provide.

ENDNOTES

23. Kitfield, James., "Is NDI The Answer?" Military Logistics Forum, January/February 1986, p. 17.

24. Ibid., p. 19.

NONDEVELOPMENTAL ITEMS ACQUISITION, FACT OR FICTION?

CHAPTER V

RECOMMENDATIONS

Prioritize funding by mission areas, not individual lines. This will allow for stability in NDI programs funding. I feel that the recent changes made by the Packard Commission on acquisition management philosophy has given the program managers the opportunity to prove that from a business stand point it may be smarter to buy a large quantity of one system rather than buying a lot of smaller systems.

Review and scrutinize requirement documents to ensure capabilities are not being overstated. Only then can systems be fielded that are effective and necessary.

Modify the Buy-American Act and delete the added 50 percent unit cost for foreign items. This would reduce costs and allow the Army to capitalize on existing technologies. This would also force American manufacturers to become more price competitive for defense contracts.

In conclusion, NDI acquisitions make sense from both an economic and time perspective. They are also adaptable for both the procurement of complex weapon systems as well as support systems.

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APPENDIX 1

GLOSSARY

Acquisition Strategy (AS):	Conceptual framework for conducting materiel acquisition, encompassing broad concepts and objectives that direct and control overall development, production, and deployment of a materiel system. Evolves parallel with the system maturation. Must be stable enough to provide continuity but dynamic enough to accommodate change.
Basis of Issue Plan:	A planning document that lists certain TOE (Level), TDA, CTA, JTA, and AOP in which a new item will be placed, the number of items to be included in each organization element and other equipment and personnel changes needed because of the new item. BOIP is not an authorization document.
Combat developer:	Command or agency that formulates doctrine, concepts, organization, materiel requirements, and objectives. Represents the user community in the materiel acquisition process.
Commercial products or Items:	Products or items in regular production sold in substantial quantities to the general public and industry at established market or catalog prices.
Concept Exploration Phase:	Initial phase of the materiel acquisition process. During this phase, the AS is developed, system alternatives are proposed and examined, and the materiel requirements document is refined to support subsequent phases.

Cost and Operational
Effectiveness Analysis
(COEA):

Comparison between costs to develop, produce, distribute, and maintain a materiel system and ability of the system to meet the requirement for eliminating or reducing a force or mission deficiency.

Demonstration and
Validation Phase:

Normally the second phase in the acquisition process. Consists of steps necessary to resolve or minimize logistics problems identified during concept exploration verify preliminary design and engineering, accomplish necessary planning, fully analyze tradeoff proposals, and prepare contract required for Full Scale Development.

Effective Competition:

A market place condition which results when two or more manufacturing sources are acting independently of each other.

Full Scale Development
(FSD) Phase:

Normally the third phase in the materiel acquisition phase during which a system, including all items necessary for its support, is fully developed, engineered, fabricated, tested, and initially Type Classified.

Integrated Logistics
Support (ILS):

Composite of elements necessary to assure effective and economical support of a system or equipment at all levels of maintenance for its programmed life cycle.

Life Cycle Cost:

Approach to costing that considers all costs incurred during the projected life of the system, subsystem or component being evaluated. Includes cost to develop, procure, operate, and maintain and support the system over its useful life.

Market Survey:

Process of gathering information before making acquisition decisions. Conducted during Concept Exploration Phase.

Materiel Developer:	Command or agency responsible for research, development, and production of a system in response to approved requirements.
Materiel Requirements	Document which states concisely minimum essential operational, technical, logistical, and cost information necessary to initiate development or procurement of a materiel system.
Mission Area Analysis (MAA):	Assessment of capability of a force to perform within a particular battlefield or functional area. Designed to discover deficiencies in doctrine, organizations, training, and materiel, and to identify means of correcting these deficiencies. Provides a basis for applying advanced technology to future Army operations.
Modification Table of Organization and Equipment (MTOE):	Developed from a base TOE. Reflects requirements and authorization for a unit to perform its mission(s). Also shows organizational structure and is an authorization document to requisition personnel and equipment.
Operational and Organizational Plan (O&O):	An operational, organizational, training, and logistical plan for the employment of specific hardware systems within Army organizations. O&O Plans are based on operational concepts and are developed in conjunction with those concepts. Each O&O Plan should be able to trace its lineage through one or more functional concepts to the basic umbrella concept.
Product Improvement:	Effort to incorporate a configuration change involving engineering and testing effort on end items and depot repairable components, or changes on other than developmental items to increase system or combat effectiveness or extend the useful military life.

Production and Deployment:	Normally, the fourth phase in the materiel acquisition process. Operational units are trained, equipment is procured to meet the wartime requirement and distributed, and logistical support is provided.
Tables of Distribution and Allowances (TDA):	Authorization document for unique units that perform specific support missions for which a TOE does not exist and are fundamentally for sustaining functions. Contains any combination of military and/or civilian personnel and equipment to perform a mission.
Table of Organization and Equipment (TOE):	A table that prescribes a normal mission and the organizational structure, personnel and equipment requirements for a military unit.
Tradeoff analysis (TOA):	A document prepared by a STF or SSG, or jointly by the combat and materiel to determine which technical approach in the TOD is best.
Tradeoff determination (TOD):	The document prepared by the materiel developer. It is sent to the combat developer to convey the feasibility of a potential system. Included are technical risks related to each approach estimated R&D, and procurement costs and schedules.
User:	The command, unit, or element that will use the item to carry out a designated mission. The item will be included in its TOE or TDA.

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